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Application Number 09/843,676

Filing Date April 26, 2001

First Named Inventor Cech, Thomas R.

Group Art Unit 1646

Exeminer Name To Be Assigned

015389-002943US

U.S. PATENT DOCUMENTS U.S. Patent Document Pagas, Columns, Unes, Where Relevant Passages or Relevant Figures Appear Eximinar Inidals * Cita No.1 Deterof Publication of Cited Document Kind Code Name of Patentee or Applicant of Cited Document Number (if known) MM-DO-YYYY , Ob 6,258,535 Villeponteau et al. **B**1 07-10-2001 В 6,261,556 **B**1 07-17-2001 Weinrich at al. illo C 6,261,836 **B1** Cech at at. 07-17-2001

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Application Number	09/843,676	Z
Filing Date	April 26, 2001	<u> </u>
First Named Inventor	Cech, Thomas R.	16
Group Art Unit	1646 .	- 6
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Attorney Docket Number	015389-002943US	8

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iW.	Α	3,817,837		Tanenholtz et al.	06-18-74	
dw.	В	3,850,752		Schuurs et al.	11-26-74	
iW	С	3,939,350		Kronick et al.	02-17-76	
W	D	3,996,345		Ullman et al.	12-01-76	
de	E	4,275,149		Litman et al.	06-23-81	
cM	F	4,277,437		Maggio	07-07-81	
iM	G	4,366,241		Tom et al.	12-28-82	
W.	Н	4,683,195		Mullis et al.	07-28-87	
iW	1	4,683,202		Mullis	07-28-87	
M	J	4,816,567		Cabilly et al.	03-28-89	
W.	К	4,965,188		Mullis et al.	10-23-90	
M	L	5,489,508		West et al.	02-06-96	
W.	М	5,583,016		Villeponteau et al.	12-10-96	
M.	N	5,747,317		Cao	05-05-98	
M	0	5,770,422		Collins	06-23-98	
W.	Р	6,093,809		Cech, et al.	07/25/00	
W	0	6,258,535	B1	Villeponteau ot al.	07-10-01	plandy in INC
W	R	0,201,558	B1	Weinrich et al.	07-17-01	Wrendy in DS
ANT-	-5-	6,261,836	B1	Cech et al.	07-17-01	filed Jan 4,02

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iW	Т	JP	09154575-A		06-17-97		
dw	U	PCT	WO 93/23572		11/93		
NW.	V	PCT	WO 95/13382		5/95		
ille	w	PCT	WO 96/01835		01-25-96		
MN	X	PCT	WO 96/12811		05-02-96		
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M.	AB	PCT	WO 98/01543		01-15-98		
W	AC	PCT	WO 98/07838		03-05-98		
M	AD	PCT	WO 98/08938		02-26-98		

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elw.	AE	PCT	WO 98/21343		05-22-98		
Un.	AF	PCT	WO 98/23759		06-98		
ilm.	AG	PCT	WO 98/37181		08-27-98		
w	AH	PCT	WO 98/45450		10-15-98		
W	Al	PCT	WO98/59040		12-30-98		
W.	AJ	PCT	WO99/01560		01-14-99		

		OTHER PRIOR ART NON PATENT LITERATURE DOCUMENTS	
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dul	AK	1994 Genome Issue of <i>Science</i> (265:1981f)	
M	AL	Anderson and Young, "Quantitative Filter Hybridization" in Nucleic Acid Hybridization pp73-111 (1985)	
dw	. AM	Ausubel et al., Current Protocols in Molecular Biology, John Wiley & Sons, New York NY (1989)	
du	AN	Autexier et al., "Reconstitution of human telomerase activity and identification of a minimal functional region of the human telomerase RNA," (1996) EMBO J, 15:5928	
M	AO	Autexier, C. et al, "Telomerase and cancer: revisiting the telomere hypothesis," Trends in Biochemical Sciences, 10 (21): 387-391 (1996).	
du	AP	Auxexier and Greider, "Functional reconstitution of wild-type and mutant <i>Tetrahymena</i> telomerase," (1994) <i>Genes Develop.</i> , 8:563	
M	AQ	Avilion, A., "Characterization and expression of human telomerase," Dissertation Abstracts International, 56 (11) 5930-B (1996).	
M	AR	Barinaga, M., "The Telomerase Picture Fills In," Science 276:528-529 (1997).	
M	AS	Berger and Kimmel, Guide to Molecular Cloning Techniques, Meth. Enzymol., vol. 152, Academic Press, San Diego CA (1987)	

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				Group Art Unit	1646	7/0
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dw	AT	Biessmann et al., "Addition of Telomere-Associated HeT DNA Sequences "Heals" Broken Chromosome Ends in Drosophila," Cell 61:663 [1990].	
W	AU	Bitter et al., "Expression and secretion vectors for yeast," Meth Enzymol., (1987) 153:516	
lur	AV	Blackburn and Chiou, "Non-nucleosomal packaging of a tandemly repeated DNA sequence at termini of extrachromosomal DNA coding for rRNA in Tetrahymena," (1981) Proc. Natl. Acad. Sci., 78:2263	
du	AW	Blackburn and Gall, " A tandemly repeated sequence at the termini of the extrachromosomal ribosomal RNA genes in <i>Tetrahymena</i> , " (1978) <i>J. Mol. Biol.</i> , 120:33	
W	AX	Blackburn, "Telomerases," (1992) Ann. Rev. Biochem., 61:113	
UW	AY	Bodnar et al., "Extension of Life-Span by Introduction of Telomerase into Normal Human Cells," (1998) Science, 279:349	
dw	AZ	Bradford, "A Rapid and Sensitive method for the Quantitation of Microgram Quantities of Protein Utilizing the Principle of Protein-Dye Binding," (1976) Anal. Biochem., 72:248	
LW	ВА	Braunstein et al., "Transcriptional silencing in yeast is associated with reduced nucleosome acetylation," (1993) Genes Develop., 7:592	
Mil	ВВ	Calvio et al., "Identification of hnRNP P2 as TLS/FUS using electrospray mass spectrometry," (1995) RNA, 1:724	
M	вс	Caruthers et al., "New chemical methods for synthesizing polynucleotides," (1980) Nucleic Acids Res. Symp. Ser., 215-223	
LW	BD	Chan and Tye, "Organization of DNA sequences and replication origins at yeat telomeres, " (1983) Cell, 33:563	
M	BE	Colbere-Garapin et al., "A new dominat hybrid selective marker for higher eukaryotic cells," (1981) J. Mol. Biol., 150:1	
MS	BF	Cole et al., "The EBV-hybridoma technique and its application to human lung cancer," Monoclonal Antibodies and Cancer Therapy, Alan R. Liss Inc., New York NY 77-96 (1985)	
dw	BG	Collins et al., "Purification of Tetrahymena telomerase and cloning of genes encoding the two peotein components of the enzyme," (1995) Cell, 81:677	
M	вн	Collins, K., "Structure and Function of Telomerase," Curr. Op. Cell. Biol. 8:374-380 (1996).	

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CACEMAS Substitute for form 1449B/PTO Complete if Known **Application Number** 09/843,676 INFORMATION DISCLOSURE **Filing Date** April 26, 2001 STATEMENT BY APPLICANT **First Named Inventor** Cech, Thomas R. 1646 Group Art Unit (use as many sheets as necessary) **Examiner Name** To Be Assigned Attorney Docket Number 015389-002943US

		OTHER PRIOR ART NON PATENT LITERATURE DOCUMENTS	
Examin er Initials *	Cite No.1	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T ²
M	ВІ	Conrad et al., "RAP1 protein interacts with yeast telomers in vivo: Overproduction alters telomere structure and decreases chromosome stability," (1990) Cell, 63:739	
In	BJ	Coombs, Dictionary of Biotechnology, Stockton Press, New York NY (1994)	
du	вк	Cote et al., "Generation of human monoclonal antibodies reactive with cellular antigens, " (1983) Proc. Natl. Acad. Sci., 80:2026	
M	BL	Counter et al., "The catalytic subunit of yeast telomerase," (1997) Proc. Natl. Acad. Sci., 94:9202	
M	ВМ	Creighton, Proteins, Structures and Molecular Principles, WH Freeman and Co, New York NY [1983].	
dus	BN	Dieffenbach and Dveksler, PCR Primer, a Laboratory Manual, Cold Spring Harbor Press, Plainview NY (1995)	
dw	во	Duplaa et al., "Quantitative analysis of polymerase chain reaction products using biotinylated dUTP incorporation," (1993) Anal. Biochem., 212:229	
M	BP	Fang et al., "Oxytricha telomere-binding protein: separable DNA-binding and dimerization domains of the α-subunit," Genes Develop. 7:870 (1993) and Gray et al., (1991) Cell 67:807	
M	BQ	Feng et al., "The RNA Componant of Human Telomerase," (1995) Science, 269:1236	
M	BR	GenBank Accession No. AA281296	
M	BS	Genbank accession no. AA299878	
du	вт	Genbank accession no. AA311750	
M	BU	Gilley et al., "Altering specific telomerase RNA template residues affects active site function," (1995) Genes Develop., 9:2214	
W	BV	Gottschling and Cech, "Chromatin Structure of the Molecular Ends of Oxytricha Mononuclear DNA: Phased Nucleosomes and a Telomeric Complex," (1984) Cell, 38:501	
dw	BW	Gottschling and Zakian, "Telomere proteins: specific recognition and protection of the natural termini of Oxytricha macronuclear DNA," (1986) Cell 47:195	

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		OTHER PRIOR ART NON PATENT LITERATURE DOCUMENTS	
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M	вх	Grant et al., Meth Enzymol., (1987) 153:516-544	
dw	BY	Greenwood et al., "Phylogenetic relationships within the class oligohymenophorea, phylum ciliophora, inferred from the complete small subunit rRNA gene sequences of Colpidium campylum, Glaucoma chattoni, and Opisthonecta henneguyi," (1991) J. Mol. Evol., 3:163	
dw	BZ	Greider and Blackburn, "A telomeric sequence in the RNA of Tetrahymena telomerase required for telomere repeat synthesis," (1989) <i>Nature</i> , 337:331	
M	CA	Greider and Blackburn, "Identification of a specific telomere terminal transferase activity in Tetrahymena extracts," (1985) Cell, 43:405	
du	СВ	Greider, "Telomerase is processive, " (1991) Mol. Cell. Biol., 11:4572	
dul	СС	Greider, "Telomere Length Regulation," (1996) Ann. Rev. Biochem., 65:337	
M	CD	Hampton et al., Serological Methods a Laboratory Manual, APS Press, St Paul MN (1990)	
W	CE	Harrington et al., "A Mammalian Telomerase-Associated Protein," (1997) Science, 275:973	
Mil	CF	Harrington et al., "Human telomerase contains evolutionarily conserved catalytic and structural subunits," (1997) Genes Dev., 11:3109	
M	CG	Hartman and Mulligan, "Two dominant-acting selectable markers for gene transfer studies in mammalian cells," (1988) Proc. Natl. Acad. Sci., 85:8047	
M	СН	Henderson and Blackburn, "An overhanging 3' terminus is a conserved feature of telomeres," (1989) Mol Cell. Biol., 9:345	
du	CI	Hillier, et al., Direct Submission to GenBank, EST Database, Accession No. W70315, Available Oct. 17, 1996.	
dw	C1	Hom et al., "Synthesis of oligonucleotides on cellulose. Part II: design and synthetic strategy to the synthesis of 22 oligodeoxynucleotides coding for gastric inhibitory polypeptide (GIP)," (1980) Nucleic Acids Res. Symp. Ser., 225-232	
m	СК	Hudson et al., "An STS-based map of the human genome," (1995) Science, 270:1945	
dw	CL	Huse et al., "Generation of a large combinatorial library of the immunoglobulin repertoire in phage lambda," (1989) Science, 246:1275	

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Filing Date	April 26, 2001	173
First Named Inventor	Cech, Thomas R.	16
Group Art Unit	1646	8
Examiner Name	To Be Assigned	25
Attorney Docket Number	015389-002943US	87

		OTHER PRIOR ART NON PATENT LITERATURE DOCUMENTS	
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dw	СМ	Kilian et al., "Isolation of a candidate human telomerase catalytic subunit gene, which reveals complex splicing patterns in different cell types," (1997) Hum. Mol. Genet., 6:2011	
W	CN	Kipling and Cooke, "Hypervariable ultra-long telomeres in mice," (1990) Nature 347:400	
dw	со	Klobutcher et al., "All gene-sized DNA molecules in four species of hypotrichs have the same terminal sequence and an unusual 3' terminus," (1981) Proc. Natl. Acad. Sci., 78:3015	
lw	СР	Koehler and Milstein, "Continuous cultures of fused cells secreting antibody of predefined specificity," (1975) Nature 256:495	
dw	ca	Kosbor et al., "The production of monoclonal antibodies from human lymphocytes," (1983) Immunol. Today 4:72	
M	CR	Lamond and Sproat, (1994)"Isolation and Characterization of Ribonucleoprotein Complexes," pp103-140	
dw	cs	Lamond et al., "Probing the structure and function of U2 snRNP with antisense oligonucleotides made of 2'-OMe RNA," (1989) Cell, 58:383	
dw	СТ	Lendvay et al., "Senescence mutants of Saccharomyces cerevisiae with a defect in telomere replication identify three additional EST genes," (1996) Genetics, 144	
dw	cu	Lingler et al., "Purification of telomerase from Euplotes adeiculatus: requirement of a primer 3' overhang," (1996) Proc. Natl. Acad. Sci., 93:10712	
Mrs	cv	Lingler et al., "Reverse transcriptase motifs in the catalytic subunit of telomerase," (1997) Science, 276:561	
Mul	cw	Lingner et al., "Telomerase RNAs of different ciliates have a common secondary structure and a permuted template, "(1994) Genes Develop., 8:1984	
un	сх	Lingner et al., "Telomerase and DNA End Replication: No Longer a Lagging Strand Problem?," (1995) Science 269:1533	
dul	CY	Lowy et al., "Isolation of transforming DNA: Cloning the hamster aprt gene," (1980) Cell, 22:817	
dus	cz	Lundblad, V. et al., "RNA-dependent polymerase motifs in EST1: tentative identification of a protein component of an essential yeast telomerase," Cell, 60 (5):29-30 (1990).	
dus	DA _.	Lustig and Petes, Identification of yeast mutants with altered telomere structure," (1986) <i>Proc. Natl. Acad. Sci.</i> , 83:1398	`

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dus	DB	Lustig, A., "The Identification of Telomerase Subunits: Catalysing Telomere Research," Trends Cell. Biol. 7:299-302 (1997).	
du	DC	Maddox et al., "Elevated serum levels in human pregnancy of a molecule immunochemically similar to eosinophil granule major basic protein," (1983) J. Exp. Med., 158:1211	
M	DD	Makarov et al., "Nucleosomal Organization of Telomere-Specific Chromatin in Rat," (1993) Cell, 73:775	
du	DE	McEachern and Blackburn, "runaway telomere elongation caused by telomerase RNA gene mutation," (1995) Nature, 376:403	
der	DF	Melby et al., "Quantitative measurement of human cytokine gene expression by polymerase chain reaction," (1993) J. Immunol. Meth., 159:235	
dw	DG	Merrifield, "Solid phase peptide synthesis. I. The synthesis of a tetrapeptide," (1963) J. Am. Chem. Soc., 85:2149	
W	DH	Meyerson et al., "hEST2, the Putative Human Telomerase Catalytic Subunit Gene, Is Up-Regulated in Tumor Cells and during Immortalization," (1997) Cell, 90:785	,
m	DI	Murray, In McGraw Hill Yearbook of Science and Technology, (1992) McGraw Hill, New York NY, pp 191-196	
dW	DJ	Nakamura et al., "Telomerase Catalytic Subunit Homologs from Fission Yeast and Human," (1997) Science, 277:955	
del	DK	Nakayama et al., "Cloning of a Candidate cDNA Encoding a Proteinaceous Component of Mammalian Telomerase," Mol. Biol. Cell. Abstracts Supp. 7 p. 286a, .sctn. 1664 (1996).	
de	DL	Nakayama et al., "TLP1: A Gene Encoding a Protein Component of Mammalian Telomerase Is a Novel Member of WD Repeats Family," (1997) Cell,88:875	
W	DM	Nielsen et al., (1993) "Peptide nucleic acids (PNAs): Potential antisense and anti-gene agents," Anticancer Drug Des., 8:53	
W	DN	Oka et al., "Inverted terminal repeat sequence in the macronuclear DNA of Stylonychia pustulata," (1980) Gene, 10:301	
M	DO	Olovnikov, "A theory of marginotomy: The incomplete copying of template margin in enzymic synthesis of polynucleotides and biological significance of the phenomenon," (1973) <i>J. Theor. Biol.</i> , 41:181	
M	DP	Orlandi et al., "Cloning immunoglobulin variable domains for expression by the polymerase chain reaction," (1989) Proc. Natl. Acad. Sci., 86:3833	

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT

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10 Sheet Page 8 of

MARKS	C mplete if Known	C _E
Application Number	09/843,676	
Filing Date	April 26, 2001	[T]
First Named Inventor	Cech, Thomas R.	<u></u>
Group Art Unit	1646	8
Examiner Name	To Be Assigned	129
Attorney Docket Number	015389-002943US	8

		OTHER PRIOR ART NON PATENT LITERATURE DOCUMENTS	,
Examin er Initials *	Cite No.1	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T 2
des	DQ	Prescott, "The DNA of ciliated protozoa," (1994) Microbiol. Rev., 58:233	
del	DR	Price, (1993) Blood Rev., 7:127	
W	DS	Rhodes et al., "Transformation of maize by electroporation of embryos," (1995) Meth. Mol. Biol., 55:121	
M	DT	Roberge et al., "A strategy for a convergent synthesis of N-linked glycopeptides on a solid support," (1995) Science, 269:202	
W	DU .	Romero and Blackburn, "A conserved secondary structure for telomerase RNA, " (1991) Cell, 67:343	
M	DV	Sambrook et al., Molecular Cloning, A Laboratory Manual, Cold Spring Harbor Press, Plainview NY (1989)	
W	DW	Sandell et al., "Transcription of yeast telomere alleviates telomere position effect without affecting chromosome stability, "(1994) Proc. Natl. Acad. Sci., 91:12061	
M	DX	Sanger et al., "DNA sequencing with chain-terminating inhibitors," Proc. Natl. Acad. Sci., 74:5463 [1977].	
Mi	DY	Scharf et al., "Heat stress promoters and transcription factors," (1994) Result Probl. Cell Differ. 20:125	
W	DZ	Shampay and Blackburn, "Generation of telomere-length heterogeneity in Saccharomyces cerevisiae," (1988) Proc. Natl. Acad. Sci., 85:534	
M	EA	Sheen and Levis, "Transposition of the LINE-like retrotransposon TART to <i>Drosophila</i> chromosome termini," (1994) <i>Proc. Natl. Acad. Sci.</i> , 91:12510	
M	EΒ	Singer and Gottschling, "TLC1: Template RNA Component of Saccharomyces cerevisiae Telomerase," (1994) Science 266:404	
W	EC	Singer, M., "Unusual Reverse Transcriptases," J. Biol. Chem. 270(42):24623-24626 (1995).	
M	ED	Starling et al., "Extensive telomere repeat arrays in mouse are hypervariable," (1990) Nucleic Acids Res., 18:6881	
M	EE	Swanton et al., "Arrangement of Coding and Non-coding Sequences in the DNA Molecules Coding for rRNAs in Oxytricha sp.," (1980) Chromosoma 77:203	

Examiner Signature	Modella	Date Considered	[[19/63

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	Complete if Known	受
Application Number	09/843,676	
Filing Date	April 26, 2001	Ä
First Named Inventor	Cech, Thomas R.	16(
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Examiner Name	To Be Assigned	<u> </u>
Attorney Docket Number	015389-002943US	8

OTHER PRIOR ART NON PATENT LITERATURE DOCUMENTS				
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M	EF	Tommerup et al., "Unusual chromatin in human telomeres," (1994) Mol. Cell. Biol., 14:5777		
M	EG	Trask, "Fluorescence in situ hybridization: application in cytogenetics and gene mapping," (1991) Trends Genet., 7:149		
M	EH	Verma et al., "Human Chromosomes: A Manual of Basic Techniques," Pergamon Press, New York NY (1988)		
M	EI	Watson, "Origin of concatermeric T7 DNA, " (1972) Nature New Biol., 239:197		
M	EJ	Weinrich et al., "Reconstitution of human telomerase with the template RNA component hTR and the catalytic protein subunit hTRT," (1997) Nat. Genet., 17(4):498		
M	EK	Wellinger et al., "Origin activation and formation of single-strand TG ₁₋₃ tails occur sequentially in late S phase on a Yeast linear plasmid," (1993) Mol. Cell. Biol., 13:4057		
W	EL	Wellinger et al., "Saccharomyces Telomeres Acquire Single-Strand TG ₁₋₃ Tails Late in S Phase," (1993) Cell 72:51		
lw	EM	Whitehead Institute/MIT Center for Genome Research, Genetic Map of the Mouse, Database Release 10, APril 28, 1995		
W	EN	Wigler et al., "Transfer of purified herpes virus thymidine kinase gene to cultured mouse cells," (1977) Cell, 11:223		
W	EO	Wigler et al., "Transformation of mammalian cells with an amplifiable dominant-acting gene," (1980) Proc. Natl. Acad. Sci., 77:3567		
W	EP	Winter and Milstein, "Man-made antibodies," (1991) Nature, 349:293		
M	EQ	Wright et al., "Saccharomyces telomeres assume a non-nucleosomal chromatin structure, " (1992) Genes Develop., 6:197		
dw	ER	Yu et al., "In vivo alteration of telomere sequences and senescence caused by mutated Tetrahymena telomerase RNAs," (1990) Nature, 344:126		
M	ES	Zahler and Prescott, "Telomere terminal transferase activity in the hypotrichous ciliate Oxytricha nova and a model for replication of the ends of linear DNA molecules," (1988) Nucleic Acids Res., 16:6953		
W	ET	Zakian, Telomeres: Beginning to Understand the End," (1995) Science 270:1601		

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Examiner Signature	Malvolea	Date Considered	11/19/03

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Sheet Page 10 of 10

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Group Art Unit	1646	Ĉ.
Examiner Name	To Be Assigned	2/2
Attorney Docket Number	015389-002943US	9

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M	EU	Zaug et al., "Catalysis of RNA Cleavage by a Ribozyme Derived from the Group I Intron of Anabaena Pre-tRNA ^{Leu} ,"			
der	EV	Zaug, A. J. et al., "Method for determining RNA 3' ends and application to human telomerase RNA," Nucleic Acids Research, 24 (3): 532-533 (1996).			

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Signature	Maliclea	Considered	11	19	0 0

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